SF 6.9.1.1

MEMORANDUM

SUBJECT: Long Term Management of Acid Mine Water from the Bunker Hill Mine and Additional Desired Mine-Related Investigations at the Bunker Hill Superfund Site

FROM: Mike Thomas, Idaho Division of Environmental Quality (DEQ)
Mary Kay Voytilla, Environmental Protection Agency (EPA)

TO: Bunker Hill Project Team (See Distribution List)

DATE: 2/9/98 - draft

The purpose of this memo is to initiate discussions amongst the Bunker Hill Project Team regarding long term water management issues associated with the Bunker Hill Mine. The Team has worked tirelessly over the past years to ensure that remediation efforts pursuant to the August 1991 and September 1992 Records of Decision are underway or accomplished. As we approach a critical juncture in the life of this project - the near completion of remedial activities - some of the last remaining aspects to be tackled at the site address long term management of mine water including: 1) how best to deal with acid mine drainage from the Bunker Hill Mine; 2) what additional information and/or investigations will be necessary to make decisions regarding long term water management issues; and 3) what is the role of the current mine owner in terms of conducting and/or financing these activities. With this memo, DEQ and EPA would like to jointly initiate a process for moving forward with developing answers to the questions outlined above.

Additional Mine-Related Investigations

Over the past few years, DEQ and EPA have identified and briefly discussed various strategies for addressing mine water treatment in the long term including minimizing the amount of water that has to be treated, investigating the potential for developing a sludge repository in the mine, creating additional surge capacity in the mine to handle excess flows, and installing an effective treatment system for the remaining acid water flow. Last year DEQ enlisted the assistance of Dr. Dale R. Ralston to provide suggestions for reducing or controlling inflow to the Bunker Hill Mine (see the attached memo from Dr. Ralston). Included in the list below are various other suggestions made by team members for additional mine-related investigations aimed at long-term water management.

- **Hydrogeological Investigations of the Mine** - Conduct investigations in order to further understand the hydrogeology of the mine, and the relationship of mine water to the surrounding surface water bodies. Detail areas where water flows into and out of the mine so that actions could be taken to reduce inflow and thereby reduce the amount of mine water that eventually needs to be treated. Investigate the water storage capacity of the mine by looking at how high mine water can get without impacting the surrounding surface water bodies - this could help to reduce infrastructure costs for pipes and pumps. Conduct geochemical evaluations to determine if there are areas of the mine with greater impact on acid mine formation. Estimate the condition and stability of the inside

98911

workings of the mine as a first step in evaluating in-mine sludge disposal and in-mine treatment processes. Evaluate mineral reserves in the mine.

- **In-Mine Treatment Options** - Investigate in-mine treatment options, processes, costs, and overall feasibility. Compare with continued treatment and/or enhancement at the CTP.

- **In-Mine Sludge Disposal** - Investigate the feasibility of in-mine sludge disposal including the disposal capacity of the mine, likely disposal locations, chemical characteristics of sludge and mine water, and associated costs.

- **Geotechnical Investigation of the Reed Dump** - Evaluate the long term stability of this tailings dump, the extent to which it impacts water quality in Milo Creek, and its relationship or hydrogeological connection to the mine.

- **Assessment of the Current Piping System from the Mine to the CTP** - Evaluate the current system of pipes from the mine to the lined pond and the CTP. Assess the quality of these pipes, the extent to which leaks in the pipes might contribute to contaminant loading in Bunker Creek, and any recommended improvements to the current piping system.

- **Water Treatment Enhancements as May be Required by TMDLs** - Investigate potential enhancements to the CTP, and associated costs, that may be necessary in the future to meet TMDLs that are currently being developed. Compare to costs of building a new treatment plant. Research state of the art in terms of best available technology for water treatment.

- **Mine Contingency Plan** - Develop a plan for taking over key aspects of running the mine in the event that Mr. Hopper is unable to continue to operate the mine (i.e., what needs to be done, when, and by whom). A draft plan was

- **Literature Search and Summary** - Conduct a literature search of technical documents, reports, and related information regarding the mine. Compile this information into a summary format. It has been suggested that this should be a first step prior to embarking on any additional mine-related technical investigations.

Technical Resources Available for Conducting Additional Investigations and Funding Considerations

The project team currently has two contractors available for pursuing additional technical-related activities and investigations; CH2M Hill and Terragraphics. CH2M Hill offers: access to mine-waste experts for which they can competitively bid or sole source specific work items; in-house personnel with experience in water treatment, hydrogeological investigations, and sludge; and experience managing technical investigations. Terragraphics offers: **[Mike, make some points here about the strengths that you think Terragraphics has to offer].**

Strong in all areas, but particularly implementation

It is our understanding that the mine-related investigations identified above have not, to this point, been identified as scoped or budgeted items in the project budget **[Mike, Is this your understanding? I will discuss further with Cami also]**. It will be necessary for the project team to prioritize the potential work items identified above, and identify what, if any, funding constraints exist.

Role of the Current Mine Owner

Both DEQ and EPA would like to see the mine owner take responsibility for treating the water coming from the mine. The mine water makes up the bulk of the water currently being treated at the Central Treatment Plant. The remaining water being treated now is collected surface flow from the site and is a Superfund obligation. This contaminated water is expected to diminish to zero over the next few years as source control efforts take hold. DEQ and EPA also believe that the mine owner has a role to play in conducting and/or financing the mine-related investigations identified above. Clearly, we will need to have further discussions regarding the extent of the mine owners involvement in this process. **[Mike, I would like to give Bob a copy of this letter (as a way to let him know what else we have in mind) so I am purposefully keeping what's said here rather "bland." I'll also have Ted take a look at this section specifically once we get closer to a final letter.].**

Next Steps

We would like to arrange a meeting of the project team to discuss this memo, and specifically the "next steps" items discussed below. For the sake of simplicity, we suggest that a subgroup of the project team be identified for the purpose of discussing and moving forward with long term water management issues, and identifying and scoping any additional mine-related investigations. This subgroup would be responsible for keeping other members of the project team informed about meetings and ongoing activities, and for seeking comments from team members on any technical proposals. We will be contacting you to identify appropriate subgroup participants, and available meeting times. Below is our proposal for the "next steps" to be taken by the subgroup. In the meantime, if you have any questions, please call Mike at (208) 373-0318 or Mary Kay at (206) 553-2712.

- Discuss the merits of the investigations identified above, and whether there are any others that need to be added to the list. Reach consensus on the need for these efforts. Prioritize items listed above.
- Identification budget constraints on additional investigation activities.
- Discuss options for pursuing investigation activities (which contractor). Develop technical scopes of work for identified investigations.
- Review and discuss Ralston's memo regarding controlling inflow to the mine. Determine if we want to go forward with any of his specific recommendations.
- Review and discuss comments on Hudson's draft mine contingency plan. Determine how to proceed.

Distribution List: **[Mike, please add or delete as appropriate.]**

Rob Hanson, DEQ
Scott Peterson, DEQ
Nick Zilka, DEQ
Chuck Moss, DFM
Jerry Cobb, PHD
Ted Yackulic, EPA
Earl Liverman, EPA
Cami Grandinetti, EPA
Sean Sheldrake, EPA
Mike Mahoney, COE
Joan Stoupa, CH2M Hill
Tom Bourque, Terragraphics
Bill Hudson, CH2M Hill

MEMORANDUM

2/5/98

TO: Mary Kay Voytilla, EPA

FROM: Mike Thomas, IDEQ

I am providing some additional thoughts, questions, etc. to your memorandum. Basically, I think that you have crytalized the issues so my additional thoughts are minimal. Call me if you wish to discuss further.

Additional Mine Related Activities

- **Definition of Lead/Support Agency Roles** - I will suggest that the State assume the Lead Role in this effort. We will need to discuss and develop a strategy.

- **Hydrological Investigations of the Mine** - Identify worst acid producing regions of the mine, assess ability to divert water around, plug, or otherwise reduce the flow of water through the highest acid producing regions. Investigate the water storage capacity of the mine in terms of desirable surge volume containment, effects on existing mine infrastructure, needed infrastructure, etc.

- **Water Treatment Enhancements as May be Required by TMDLs**. The current proposed site specific TMDL for the South Fork CdA River is 163 ppb zinc chronic and acute. Goldbook is 28 ppb zinc. The CdA River presently runs about 1ppm or 1000 ppb zinc. You can see that there is a long way to go to meet either the proposed site specific TMDL or Goldbook criteria for water quality standards.

Technical Resources available for Conducting Additonal Investigations and Funding Considerations.

Terragraphics offers access to experts with direct experience on Bunker Hill Mine hydrogeologic, geochemical, physical and engineering features. These experts have knowledge of past studies performed on mine water infiltration, knowledge of where acid production is greatest, and ideas about how to mitigate the problems related to the Bunker Hill mine. These experts are also known to the owner of the Bunker Hill Mine and have worked with him in the past. Additonal strengths that Terragraphics has include hydrologic investigations and project management.

Role of the Current Mine Owner

We need to decide how to proceed with the current mine owner. Hopefully, the negotiated solution to Hopper's 104e problem will yield information that will enable us to decide if ; a) Hopper is financially viable, b) if he is, can we craft a AOC or Consent Decree to have him complete work or pay us back for work that we do?, c) if he is not, do we move him out and take over ourselves? (This need not be in the formal letter if we are going to share with Bob Hopper)

It is also my understanding that mine-related investigations are not scoped or budgeted. The State role could be funded through the Cooperative Agreement or a combination of Cooperative Agreement and State funds.